IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Application of:	ATSUHIRO OHKAWA ET AL
Confirmation No.:	9882
Group Art Unit:	1772
Serial No.:	10/076,443
Examiner:	SOW-FUN HON
Filed:	February 19, 2002
For:	OPTICAL FILM COMPRISING SUPPORT AND POLARIZING LAYER

DECLARATION PURSUANT TO RULE 132

Honorable Commissioner of Patents and Trademarks
Washington, D.C.

I, Hideyuki Nishikawa, one of the above-named applicants, declare and state that:

I hereby submit experimental data obtained by experiments, which were recently performed by me.

Summary

In the following Comparative Examples 11 and 12, I prepared and evaluated an optical film in the same manner as in Example 1 given in our specification on page 144, line 14 to page 145, line 14, except that 4'-pentyloxy-4-biphenylcarbonitrile (i.e., M-15, 4-cyano-4'-pentoxybiphenyl disclosed in West et al. at column 12, lines 47-50) and the ferro-electric liquid crystal W-7 (disclosed in West et a. at column 17, line66 to column 18, line 8) were used respectively in place of the Compound (3) in Example 1.

The results are set forth in Table A.

Comparative Example 11

(Preparation of coating solution for polarizing layer)

In 150 g of ethyl acetate, 48 g of 4'-pentyloxy-4-biphenylcarbonitrile (i.e., M-15, 4-cyano-4'-pentoxybiphenyl disclosed in West et al. at column 12, lines 47-50) was dissolved. The solution was filtered through a polypropylene filter (porous size: 30 μm) to prepare a solution for discontinuous phase.

Independently, 4.0 g of sodium dodecylbenzenesulfonate (surface active agent) was added into 2,000 g of 20 wt.% polyvinyl alcohol aqueous solution (PVA 205, Kuraray Co., Ltd.). The solution was filtered through a polypropylene filter (porous size: 30 μm) to prepare an aqueous solution for continuous phase.

The prepared solutions were mixed in each amount of 200 g, and the mixture was dispersed with an ultrasonic disperser to prepare a coating solution for polarizing layer.

(Preparation of optical film)

The coating solution for polarizing layer was applied from a die onto a polyethylene terephthalate film (thickness: 6 μm), and then dried to form a polarizing layer. The amount of applied solution was adjusted so that the formed polarizing layer may have a thickness of 30 μm. The thus-prepared film (having the polarizing layer on the support) was stretched by 1.25 times at 25°C under a dry condition to prepare an optical film.

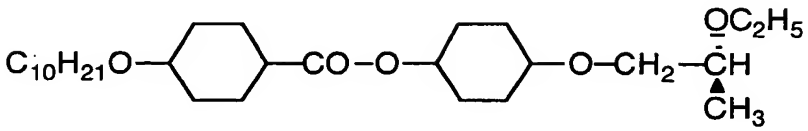
Comparative Example 12

(Preparation of coating solution for polarizing layer)

In 150 g of ethyl acetate, 48 g of the following ferro-electric liquid crystal W-7 (disclosed in West et a. at column 17, line66 to column 18, line 8) was dissolved. The solution was filtered through a polypropylene filter

(porous size: 30 μm) to prepare a solution for discontinuous phase.

(W-7)



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The prepared solutions were mixed in each amount of 200 g, and the mixture was dispersed with an ultrasonic disperser to prepare a coating solution for polarizing layer.

(Preparation of optical film)

An optical film was prepared in the same manner as in the Comparative Example 1, except that the above-prepared coating solution was used.

Evaluation of optical films

Each of the optical films prepared in the Comparative Examples 11 and 12 was evaluated in the following manners.

1. Birefringence

The birefringence of the continuous phase was measured. For this measurement, each corresponding film without the discontinuous phase was prepared and stretched in the same stretching degree as described above. The refractive index in each direction of MD and TD of the film was measured with an Abbe's refractometer.

2. Transmittance and scattering degree (haze)

The transmittance and the haze of each prepared film were measured with a haze mater (MODEL 1001DP, Nippon Denshoku Kogyo Co., Ltd.). In the measurement, a polarizer was inserted between the light source and the film. The measurement was carried out with the transparent axis of the polarizer placed parallel or perpendicular to that of the polarizing layer. The measured values when the axes are parallel are shown as values in parallel, and those when the axes are perpendicularly placed are shown as values in perpendicular. The scattering degree was evaluated in terms of haze value. If the film has polarizability, the transmittance in parallel is higher than that in perpendicular while the haze in parallel is lower than that in perpendicular.

3. Particle size of discontinuous phase

The particle size of the discontinuous phase of polarizing layer in each film was measured. The film was cut with a microtome, and the section was observed by an electron microscope of scanning type. From the thus-obtained microscopic photograph (×5,000), a hundred of discontinuous phase (particles) were randomly selected and their sizes were measured in terms of radius corresponding circle.

The results are set forth in Table A.

In Table A, the results of the Examples 1-5 and the Comparative Example 1 are set forth again for reference.

TABLE A

Optical film	Bire-fringence	Transmittance		Haze		Particle Size*)
		Perpen-dicular	Paral-lel	Perpen-dicular	Paral-lel	
Ex. 1	<0.01	43.2	92.8	88.4	13.2	0.25 μm
Ex. 2	<0.01	42.1	93.5	89.8	12.9	0.24 μm
Ex. 3	<0.01	44.7	92.2	87.3	14.0	0.21 μm
Ex. 4	<0.01	45.0	91.9	86.8	14.1	0.20 μm
Ex. 5	<0.01	44.3	91.6	87.2	13.8	0.21 μm
Comp.1	<0.01	50.5	89.7	82.6	18.8	0.22 μm
Comp.11	<0.01	50.4	89.3	82.8	18.9	0.22 μm
Comp.12	<0.01	92.1	93.2	14.0	13.2	0.20 μm

Remarks

*) Particle size of discontinuous phase

Discussion

As shown in Table A, each film of Examples 1 to 5 has a small transmittance in perpendicular and a large transmittance in parallel. This means that those films have high polarizing functions.

The undersigned declarant declares further that all statements made herein of his own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code and that such willful false statements may jeopardize the validity of the application or any patent issuing thereon.

Date November 14, 2005 Hideyuki Nishikawa

HIDEYUKI NISHIKAWA